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AARI
Alberta Agricultural
Research Institute

THE LINK

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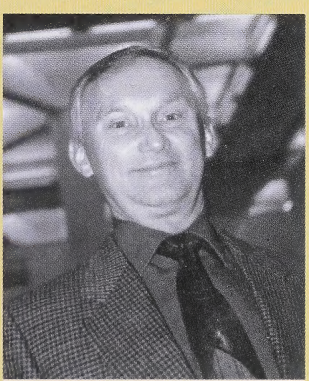
Did you know...

A sunflower is ready to harvest when the back portion of the head turns brown.

Meet Two AARI Board Members

Mr. Neal Oberg

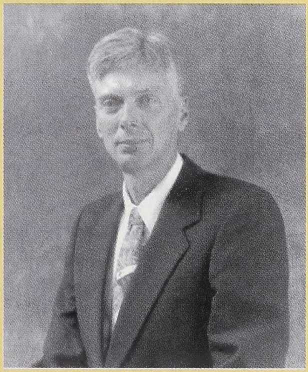


I was appointed to the Alberta Agricultural Research Institute (AARI) Board of Directors in 1993 as a representative for on-farm producers in Alberta. As a producer member, I chaired the Beef and Dairy Research Review committee for six years.

As AARI currently re-aligns its mandate within the Alberta Science and Research Authority, we have the privilege of representing the agriculture industry in discussion and in decisions concerning research and development in this province. This is both an opportunity and a responsibility. The opportunity is to, at last, bring agriculture to the forefront as a leader for the sustainable economic future of the industry, the province, and the country. The responsibility is to improve agriculture's contribution in a provincially integrated research, development and technology transfer system, wherein all resources are used effectively and efficiently.

To AARI, I bring experience with farming and ranching, value-added business assessment, research and management economics, and an arbitration and mediation background. With this experience, I can only hope that my contribution to AARI and to agriculture in this province is useful and constructive. ■

Dr. Rob Rennie



Because of the knowledge I have garnered from a long career in research and development, which also includes teaching experience and most recently an executive position with Agrium Inc., I was appointed to the Alberta Agricultural Research Institute (AARI) Board of Directors in 2000. Since I am also a member of the Alberta Science and Research Authority (ASRA) Board, my function with AARI is twofold - to present the AARI perspective to ASRA and to keep AARI apprised of ASRA directives.

My vision is for AARI to become a strategic leader in agricultural research and development. ■

From The DIRECTOR'S Corner

The word is in. We need to tackle some important challenges in the near future if we are serious about building a successful research and technology transfer development (R&DTT) system in Alberta that will advance our agriculture, food and related life sciences sectors both economically and environmentally.

That conclusion is one of many reached by the consultant team of Serecon Management, Toma and Bouma, and S.J. Campbell Investments. The consultant team was contracted by the AARI Board of Directors this spring to clearly map out Alberta's $130 million R&DTT system, as well as to identify strategic and operational issues. The consultant's results were clear: in order to effectively achieve a successful R&DTT system, everyone - stakeholders, researchers and funders alike, must share mutual goals. We need to work together to ensure Alberta's R&DTT system is visionary, strategic, inclusive and enabling. Our future depends on our ability to collectively enhance our research capability, as well as to lead in sustainable growth and address the competitive and operational challenges of the day. In other words, united we stand, divided we fall.

The consultant team has recommended we develop an agricultural research and technology development business plan to bring stakeholders, researchers and funders -who are currently operating independently - onto the same page. AARI has begun developing such a plan. In it, we envision strategically investing and consolidating our resources to develop networks and enhance people and infrastructure capacity. With strategic leadership, new investments and new people, we can create such capacity in our R&DTT system. This capacity will enable us to move into new areas and link with other sectors, such as energy, forestry, health and environment. Consolidating our current institutional resources, as well as more efficiently using personnel, can also create some of that needed capacity and capability.

For our R&DTT system to operate successfully, everyone must clearly understand the collective direction, goals, feedback, needs, opportunities, inputs and outputs. The consultant team has, therefore, recommended that the agricultural research and technology development business plan identify the issues and steps necessary to create the R&DTT system we need to grow our industry. We know the opportunities that exist in the marketplace and we know the gaps in our R&DTT system that are currently keeping us from making the most of those opportunities. We must act now, together, if we are to succeed. In short, the will for action is the test!

> *"Everyone - stakeholders, researchers and funders alike, must share mutual goals."*

To read more about the consultant team's recommendations, visit our website at **www.aari.ab.ca** and read their report on Alberta's Agriculture and Food Research and Development and Technology Transfer System. We welcome your feedback.

We also spent some time determining what networks should look like and how they can drive science plans and the agenda for research in key areas of our industry's future. Again, check our website for a full profile and background on networks and their future role in building our R&DTT system.

AARI will be collaborating with a number of research organizations to put on an agriculture and emerging life sciences conference in early 2003. Plenary and concurrent sessions will be designed to provide a current and future look at our agriculture industry, and shed light on how we can contribute to renewable sources of current and future consumer food and non-food products.

Our agenda for this winter includes streamlining our partnered funding process with the Industry Development Funds, Agriculture Value Added Corporation, Ag and Food Council, and others. We will also be moving forward with a couple of networks, enhancing communication and information development, developing and delivering several strategic research initiatives and, of course, building the R&DTT system business plan.

We look forward to your input and support as we collectively work to pursue Alberta's agricultural research and technology agenda.

Wishing you a happy and healthy 2002. ▪

Don Macyk
Director

Barley - From Field to Plate

Barley is one of the major crops grown in Western Canada. Its production is important to maximizing livestock production and food quality for Canadians. The Alberta Agricultural Research Institute (AARI) has funded research in growing, selecting, and feeding barley, as well as enhancing food quality at our dinner table.

*As **AARI** continues to support such research, **Alberta** continues to improve its barley production...*

Several varieties of barley have been grown in Western Canada for many years, but very little is still known about growth comparisons among the different varieties. For example, differences among varieties of leaf and stem growth, leaf area, and the amount of nitrogen in the leaves and spikes have not yet been characterized. Knowing these characteristics, producers can decide which variety is best for grain production or forage production, while keeping in mind factors such as disease control and environment. Research funded by AARI has begun to answer some of these questions.

In a fertilizer and comparison trial in southern Alberta, researchers found that barley varieties AC Lacombe, Leduc and Kasota produced the highest yields of the 10 varieties tested. Yet, when irrigated, AC Lacombe and CDC Earl produced the highest yields. When it came to yielding the most protein, highest phosphorus content, and greatest bushel weight, Falcon and Phoenix were the winners.

In another study funded by AARI, five barley grain varieties (Brier, Noble, Oxhow, Falcon, and CD-Candle) were found to be quite different in terms of digestibility by dairy heifers. Producers had always assumed that all barley was the same when it came to feeding cattle. However, AARI research has proven this to be untrue. When lactic acid is produced in excessive amounts in the rumen, or first stomach, of animals, it can have negative consequences for their general health and growth. For example, Noble barley resulted in higher levels of lactic acid in the rumens of heifers than did Brier barley.

It has also been found that barley may also influence the type and level of fats produced in animal fat cells. As a result, it is not enough to feed barley to livestock; producers must also know which variety to feed. This may lead to future methods of storage and processing that differ from those in use today.

Another area of research that AARI has helped fund relates to comparing crop yields of cereal grain mixtures to single varieties. For example, it has been found that when Kasota and Seebe barley or Nobel and AC Lacombe barley were mixed in equal amounts, they yielded more forage than either cultivar grown separately. Species mixtures also widen the time-window for harvesting, as well as increase the crude protein content.

Barley is also a good source of beta-glucans. Research has shown that beta-glucans can thicken soft drinks and maintain water in cooked sausages, thereby improving the acceptability of these foods.

As AARI continues to support such research, Alberta continues to improve its barley production in the field, as well as find innovative ways to use barley for livestock feeding and human consumption. ■

Did you know...

The most valuable components of a chicken are the breast muscle and wings. Twenty years ago, it was the drumstick.

And...

The average farm size in Alberta is 881 acres.

Growing Strawberries in Alberta

Do plants grown in northern climates possess a special vigor lacked by members of their species elsewhere? Studies funded by the Alberta Agricultural Research Institute (AARI) have found evidence that plants grown in more northerly locations mature earlier and can be of a higher quality.

Just as potato growers have witnessed Northern Vigor - a term now registered by the potato growers and recognized by the potato industry in the U.S. Northwest - in their hauls, researchers from the University of Saskatchewan have speculated that the same could be true for strawberry crowns, a crop traditionally grown in Northern California. So they partnered with the North Peace Applied Research Association, Alberta Agriculture, Food and Rural Development, and AARI to test the viability of opening a market for producers in Alberta.

> *This **unique** project benefits producers in both **Alberta** and **California**.*

This unique project benefits producers in both Alberta and California. The strawberry plants are first grown in Alberta to harvest the benefits of Northern Vigor. This allows the mother plant to expand and create daughter runners that are then uprooted and sent to California for replanting. Ideally, Alberta producers are paid for the plants themselves, while California producers sell the fruit of their collective labor.

The team encountered a variety of challenges, the first being the lack of sandy soil in the Peace Region in which to grow the plants. California producers require plants to be shipped with clean roots. The soil must be easily removable after uprooting and before shipping. Fortunately, there was enough sandy soil in the region to allow the area to build a viable market.

The second challenge involved the profit margin. Mother plants need to create at least five daughter runners for a producer to break even; eight runners are necessary to make a profit. The additional runners are necessary for two reasons: delicate runners can be harmed during harvesting and nematode testing must be done to keep the plants healthy.

Can the Peace Region sustain plants with these unusual growth requirements? Despite a few initial setbacks, the research team believes it is possible. In fact, the special requirements could also generate jobs and pay for them due to the high demand for the crop.

Partnerships between producers in different regions are becoming more popular with the realization that combining resources and talent can increase profitability for all parties concerned. By looking into such a venture with American producers, these researchers may well be adding vigor to Alberta producers' competitiveness in the global marketplace. ■

Did you know...

Buttermilk is milk to which bacterial cultures have been added to give it its characteristic sour taste. Even though it has butter in its name, it is not a higher fat choice! It is made from either 1% or 2% milk. Its nutritional content is comparable to regular white milk except it may or may not be fortified with vitamin D. One cup or 250 mL of buttermilk (0.8% MF) has 105 calories and 2 grams of fat.

Collaboration Equals Success for Alberta

The Alberta Agricultural Research Institute (AARI) encourages partnerships with other organizations, and collaborates with groups such as the Alberta Crop Industry Development Fund, the Alberta Livestock Industry Development Fund, and Alberta Diversified Livestock Industry Development Fund, to streamline the funding process and maximize research opportunities.

This approach towards funding and research has been successful in the past, evidence being the collaboration between AARI and the Alberta Cattle Commission (ACC) through the Canada-Alberta Beef Industry Development Fund (CABIDF).

After having opted out of the National Income Stabilization program, a monetary safety net for agricultural producers, beef producers and cattle ranchers, the ACC chose to allocate their $8.2 million portion to industry development. It was decided that to generate the greatest long-term benefits, the money would best be used to create a research fund. The provincial government provided an additional $8.2 million and in 1997, CABIDF was born.

The ACC has held the fund in trust while AARI has coordinated the project and administered the grants. Since its inception, CABIDF has funded a variety of research, focusing on animal health, forages, cow/calf operations, feedlot health, intellectual resources, manure utilization and beef marketability, in hopes of creating long-term benefits within the industry. Projects, some of which have been funded in conjunction with AARI, have been approved for study on many topics, from finding ways to enhance manure as a valuable resource to attempts to increase the efficiency of winter feeding and feed use. CABIDF has also funded research into the development of vaccines against disease in cattle, systems for controlling parasites, the role of genetics in behavior, and the launch of new beef products. Any one of these studies could produce results that eventually lead to cost saving measures and new value creation for livestock products.

The Alberta Agricultural Research Institute encourages partnerships among research funders and performers.

After three years of solid research, CABIDF is no longer taking applications for project funding. Despite this, there are ongoing projects that will still be supported until 2003. The contribution of this research to the future of the beef industry will be significant and lasting. ■

CLA Research Opens a World of Possibilities

Researchers with questions about cancer in humans may be finding answers in unlikely places … like the stomachs of farm animals.

Although its existence has been documented as far back as the 1970s, public interest in the effects of Conjugated Linoleic Acid (CLA) - a substance found in the rumen, or first stomach, of animals such as cattle, sheep, and goats - has only been growing over the past few years. Linoleic Acid, the forebearer of CLA, is found in sunflower oil, peanut oil and plant extracts. When Linoleic acid is ingested, bacteria in the rumen act on it to create CLA.

The increased interest in CLA has been due, in part, to more research on the subject, and greater public access to that research. Now, a new generation of researchers, interested in the effects of the acid, wants to examine the properties of CLA in new ways and with newer technology. The Alberta Agricultural Research Institute (AARI) has funded several such studies over the past few years, some of which have confirmed that CLA has anti-carcinogenic properties.

These studies, including Catherine Field's 1999 research on CLA in beef, have shown that CLA shrinks cancerous tumours in rats. Studies also cite reduced body fat and regulated blood sugar levels among CLA's potential benefits. Field's study did not just confine itself to rats though; she also examined the cells that comprise human breast cancer. She found that, in animals, CLA boosts the immune system's response to abnormal cells. Studies into CLA's anti-carcinogenic properties in humans have not been conducted yet.

Field's animal study deviated from previous studies, because it determined that the best way to see how CLA would act on humans - specifically North Americans -

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CLA Research

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without actually testing it on them, would be to emulate a typical North American diet in the test animals. This gave rise to another interesting finding; immune cells from animals fed a typical North American diet had more cells operating for the immune system than those animals fed a more well-balanced diet.

Meanwhile, other researchers are already trying to boost CLA contents in the foods we eat. By altering the diets of cattle, researchers are increasing CLA levels in beef, and even in non-ruminant animals so poultry and pork products also contain the potential cancer-fighting agent. These attempts have only been partially successful, because CLA production and retention varies among animals of the same species, even those with similar diets. In ruminant animals such as cattle, however, some of that variation can be attributed to the way in which they are fed. For example, CLA levels have been found to be higher in cattle that graze as opposed to those on a high-energy diet.

> *Researchers with questions about cancer in humans may be finding answers in unlikely places... like the stomachs of farm animals.*

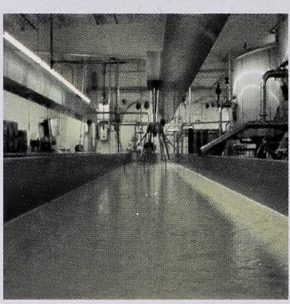
Since these discoveries, a number of individuals and organizations have been trying to market CLA as a panacea for a variety of human ailments ranging from diabetes to obesity. Researchers caution that while ingesting CLA itself has not often been shown to have harmful effects, human trials have yet to be conducted extensively.

That is not to say that CLA is not promising. In fact, Field believes that "[CLA is] one of the most potent anti-carcinogens ever found," but she adds "in animals." While animal studies have helped predict certain outcomes for humans, animals develop different kinds of tumours, making it impossible to guarantee that the results of animal testing can be duplicated with precision in humans.

Aside from the prohibitive cost of processing the acid, concerns over its negative effects have generally been confined long-term consequences not yet apparent. Researchers like Field are hoping, however, that CLA's anti-carcinogenic properties will be just as apparent in humans as in animals and will outweigh any possible negative effects. In the meantime, ongoing research is showing that CLA is more effective as a long-term preventative measure against cancer, rather than as a treatment for existing tumors in the short term.

AARI research on CLA continues with new studies, ranging from how CLA interacts with fat cells, to which form of the acid is the more effective as an anti-carcinogen. Like many discoveries, the existence of CLA opens up a world of possibilities, but as is common in science, each new answer raises a host of additional unanswered questions. ■

Did you know...



Per capita, an individual will drink 88 litres of milk a year, over 110 litres of pop, and 81 litres of alcohol.

And...

Some of Alberta's current wheat genes originated in Abyssinia (Ethiopia today) three thousand years ago.

In Our Next Issue

- Results of Round Table Meeting
- Water and Agriculture
- Due diligence process for directions in research

The LINK

The LINK is a quarterly newsletter published by the Alberta Agricultural Research Institute (AARI) that communicates with Alberta's agriculture and research communities.

Submissions and feedback are welcome.

AARI is an institute established by the *Alberta Science and Research Authority Act.*

Alberta INNOVATION AND SCIENCE
ASRA Alberta Science and Research Authority

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